

**Mailing Address**  
Alabama Power Company  
600 North 18th Street  
Post Office Box 2641  
Telephone 205 783-6090

R. P. McDonald  
Senior Vice President-  
~~XXXXXXXXXX~~  
Flintridge Building



May 23, 1984

Docket Nos. 50-348  
50-364

Director, Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Mr. S. A. Varga

Joseph M. Farley Nuclear Plant - Units 1 and 2  
Environmental Qualification of Electric Equipment

Gentlemen:

By letter dated April 27, 1984, the NRC Staff requested that Alabama Power Company (APCo) submit information related to environmental qualification of electric equipment for Farley Nuclear Plant (FNP) Units 1 and 2. The following information is in response to the request.

NRC Request: Submit all applicable JCO's that are currently being relied upon and certify the following for each JCO associated with equipment that is assumed to fail:

No significant degradation of any safety function or misleading information to the operator as a result of failure of equipment under the accident environment resulting from a design basis event will occur.

APCo Response: As stated in letters dated March 14, 1983, May 20, 1983, and February 29, 1984, it is the judgement of Alabama Power Company that all equipment within the scope of 10CFR50.49(b)(1) and (b)(2) required to achieve a safe shutdown condition at FNP is environmentally qualified and Justifications for Continued Operation (JCO) are not necessary. Equipment within the scope of 10CFR50.49(b)(3) are being environmentally qualified as a part of Alabama Power Company's R.G. 1.97 program.

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NRC Request: The licensee should certify that in performing its review of the methodology to identify equipment within the scope of 10CFR50.49(b)(2) the following steps have been addressed:

1. A list was generated of safety-related electric equipment, as defined in paragraph (b)(1) of 10CFR50.49, required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams.
2. The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips) whose failure due to postulated environmental conditions could prevent required operation of the safety-related equipment and;
3. The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&IDs, component technical manuals, and/or systems descriptions in the FSAR.
4. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

APCo Response: The criteria and methodology utilized in developing equipment within the scope of 10CFR50.49(b)(2) are as follows:

1. The Master List was generated for electrical equipment as defined by 10CFR50.49(b)(1) that could be exposed to the harsh environments caused by design-basis events and that is required to remain functional during or following a LOCA or HELB. The harsh environmental condition of the worst-case LOCA and HELB envelops the environmental conditions for all other design-basis events as documented in FSAR Section 6.2. Therefore, the LOCA/HELB accidents are the only design-basis events that result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The Master List was developed by a review of design and as-built documentation, the FSAR, Technical Specifications, Emergency Operating Procedures, P&IDs, and electrical distribution diagrams to determine the systems and components required to perform the functions of reactor trip, containment isolation, and accident mitigation. Such electrical components that could be exposed to harsh environments resulting from the design-basis events were included in the Master List. These electrical components include safety-related and nonsafety-related components and electrical components associated with plant auxiliary systems (e.g., Component Cooling Water) that are required for the operation of safety-related systems and equipment.
2. Elementary wiring diagrams of safety-related electrical equipment identified by the methods described in Item 1 above were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g. automatic trips) where failure due to postulated environmental conditions could prevent required operation of the safety-related equipment. If an adverse effect could result, the connected (interlocked) components (safety-related or nonsafety-related) were added to the Master List.



3. The operation of safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment. None of the electrical equipment identified in the Master List requires the operation of directly mechanically connected auxiliary systems that depend on electrical components for operation. Plant auxiliary systems that are directly mechanically connected to and required for the operation of mechanical safety-related equipment (e.g., Component Cooling Water) were also reviewed to identify electrical components required to be environmentally qualified as discussed in Alabama Power Company's response to Item 1 above.
4. All nonsafety-related electrical circuits directly or indirectly associated with the electrical equipment identified in Step 1 by a common power supply are properly isolated by design through coordinated protective relays, circuit breakers, and fuses for electrical fault protection. The Farley Nuclear Plant original design criteria provided electrical fault protection devices to protect components connected to a common power supply. The electrical fault protection devices for equipment within the scope of 10CFR50.49 that are required to achieve a safe shutdown condition at FNP and within a potential harsh environment resulting from design-basis events are environmentally qualified. An electrical fault on the load side of a power supply feeder breaker or fuse would be isolated without effecting the remaining loads on the common power supply. The electrical design criteria included the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL and NEC) and was reviewed and accepted by the NRC prior to receipt of the Farley Nuclear Plant operating license.

The physical proximity of nonsafety-related electrical circuits associated with electrical equipment identified in Step 1 would not cause an environmental failure. In the judgement of Alabama Power Company, there is no known scenario for the failure of nonsafety-related electrical circuits whose close physical proximity would adversely impact the capabilities of the electrical equipment identified in Item 1 to perform their intended function in a harsh environment resulting from design-basis events.

NRC Request: Provide certification that all design basis events which could potentially result in a harsh environment, including flooding outside containment, were addressed in identifying safety-related electrical equipment within the scope of 10CFR50.49(b)(1).

APCo Response: The flooding and environmental (temperature, pressure, etc.) effects resulting from the worst case LOCA and HELB were considered in the IEB 79-01B and NUREG-0588 analyses. The capability of equipment to perform its intended function as a result of flooding in the containment or main steam valve room is documented in the IEB 79-01B and NUREG-0588 submittals. The effects of flooding in areas outside containment other than the main steam valve room were analyzed and found to have no adverse effects on the capability of equipment to perform its intended function as documented in FSAR Appendix 3K.

The harsh environmental condition of the worst-case LOCA and HELB envelops the environmental conditions for all other design-basis events as documented in FSAR Section 6.2. Therefore, the LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment that is required for safe shutdown or accident mitigation. Electrical equipment that could be subject to a harsh environment and is required to mitigate the consequences of design-basis events which result in harsh environments were included in the Master List of equipment. In the opinion of Alabama Power Company, the equipment identified in the Master List complies with 10CFR450.49(b)(1) and (b)(2).

NRC Request: Certify that the electrical equipment within the scope of 10CFR50.49(b)(3) is all R.G. 1.97 Category 1 and 2 equipment or that justification has been provided for any such equipment not included in the environmental qualification program.

APCo Response: As stated in letter dated February 22, 1984, Alabama Power Company has interpreted the scope of 10CFR50.49(b)(3) to be those equipment items:

- (a) defined as Category 1 and 2 instruments in Alabama Power Company's R.G. 1.97 Compliance Report, and

Mr. S. A. Varga  
U. S. Nuclear Regulatory Commission

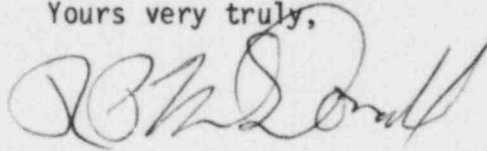
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- (b) not addressed by 10CFR50.49(b)(1) and (b)(2), and
- (c) located in a harsh environment

This response should resolve all NRC information requests necessary to complete supplemental Safety Evaluation Reports indicating that the Alabama Power Company Environmental Qualification Program is in compliance with 10CFR50.49(b)(1) and (b)(2).

If there are any questions, please advise.

Yours very truly,



R. P. McDonald

RPM/DHJ:1sh-D33  
cc: Mr. L. B. Long  
Mr. J. P. O'Reilly  
Mr. E. A. Reeves  
Mr. W. H. Bradford  
Dr. I. L. Myers